Simulated (n,f) cross sections on various Th, U, Np, Pu, and Am targets.

W. Younes

LLNL

Fission probabilities, measured in (t,pf), (^{3}He,df), and (^{3}He,tf) reactions, have been interpreted using a detailed model to estimate neutron-induced fission cross sections on a variety of actinide targets. Particular emphasis has been placed on a proper accounting of spin and parity transferred in the reactions, and on modern calculations of transmission coefficients. Using this "surrogate" technique, (n,f) cross-section estimates have been obtained to within 10% uncertainty on targets of ^{231,233}Th, ^{234,235,235m,236,237,239}U, and ^{240,241,243}Pu, for equivalent neutron energies up to $E_n = 2.2$ MeV [1,2], and on targets of ^{236,236m,237,238}Np, ^{237,237m}Pu, and ^{240,241,242,242m,243,244,244m}Am up to $E_n = 6$ MeV [3]. Of particular interest to the program, we have extracted the (n,f) cross section on the ^{235}U 26-minute isomer at 77 eV of excitation energy, and the ^{237}U(n,f) cross section, for which we have released a preliminary estimate up to $E_n = 20$ MeV, based on surrogate (t,pf) data. For some actinide targets, we have provided cross sections that cannot be measured in any other way. In the remaining cases, our results improve on or confirm previous estimates.

[1] W. Younes and H. C. Britt, Phys. Rev. C **67**, 024610 (2003).
[2] W. Younes and H. C. Britt, Phys. Rev. C **68**, 034610 (2003).
[3] W. Younes, H. C. Britt, and J. A. Becker, LLNL Tech. Rep. UCRL-TR-201913, (2004).

Email: younes1@llnl.gov